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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,690	04/09/2005	Beatrice Dagens	AVAN/000424US	7126
47389	7590	08/04/2006	EXAMINER	
PATTERSON & SHERIDAN, LLP 3040 POST OAK BLVD SUITE 1500 HOUSTON, TX 77095			DIACOU, ARI M	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 08/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/530,690

Applicant(s)

DAGENS ET AL.

Examiner

Ari M. Diacou

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9-12 recite the limitation "said structuring" in the claims. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over deWitt et al. (USP No. 3969684) in view of the Wikipedia *Laser* articles. deWitt discloses

- Regarding claim 1, deWitt discloses a stabilized gain optical amplifier including
  - an active waveguide comprising an amplification medium, extending in longitudinal, lateral and vertical directions, and coupled to [Fig. 3, #10]
  - a laser oscillation structure, wherein said laser oscillation structure comprises at least two resonant cavities extending in first and second directions which are different from the longitudinal direction of the active waveguide and [Fig. 3,  $\overline{M_1M'_1}$  and  $\overline{M_2M'_2}$ ]
  - arranged in such a way as to permit the establishment of laser oscillations having at least two different relaxation oscillation frequencies. [deWitt discloses different lengths of the resonant cavities, therefore, the equation for oscillation frequency (See Relaxation oscillations article) dictates that the oscillation frequencies be different.]

but fails to specifically disclose using a semiconductor gain medium. The

Wikipedia articles teach some different classes of known lasers at the time the

invention was made. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to make the device of deWitt in a semiconductor substrate, for the advantage of higher output powers and lower costs associated with semiconductor lasers over the gas and dye lasers disclosed in deWitt.

- Regarding claim 2, deWitt discloses The optical amplifier according to claim 1, wherein said resonant cavities have different optical path lengths. [Col. 4, lines 59-68]
- Regarding claim 3, deWitt discloses The optical amplifier according to claim 1, wherein said resonant cavities are associated with different wavelengths. [The modelocking Wikipedia reference shows that it is inherent that cavities with different lengths are associated with different wavelengths]
- Regarding claim 4, deWitt discloses The optical amplifier according to claim 1, wherein said resonant cavities and said active waveguide share at least in part said amplification medium. [Fig. 3]
- Regarding claim 5, deWitt discloses The optical amplifier according to claim 1, wherein said resonant cavities have first and second directions which are substantially parallel to each other and substantially perpendicular to said longitudinal direction and each share different portions of said amplification medium of the active waveguide. [Directions  $\overline{M_1M'_1}$  and  $\overline{M_2M'_2}$  both have components of substantial magnitude that are parallel and perpendicular to the waveguide axis]

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over deWitt and Wikipedia as applied to claims 1-6 above, and further in view of Soldano et al. (NPL) deWitt and Wikipedia disclose the invention with all the limitations of claim 1, but fails to disclose an MMI structure. Soldano teaches how to implement an MMI structure. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to utilize MMI in the device of claim 1, for the advantage of high-bandwidth applications.

8. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over deWitt and Wikipedia as applied to claims 1-5 above, and further in view of Joannopoulos (USP No. 5955749).

- Regarding claim 7, deWitt and Wikipedia disclose the invention with all the limitations of claim 1, but fail to disclose resonant cavities defined by Bragg reflectors. Joannopoulos teaches that it is common in the art to define a resonant cavity with Bragg reflectors in a semiconductor optical device [Fig. 6, #622]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to use Bragg reflectors in a semiconductor optical device, for the advantage of a cheap ubiquitous solution.
- Regarding claims 8-9, deWitt and Wikipedia disclose the invention with all the limitations of claim 1, but fail to disclose using a photonic crystal waveguide to guide light from the cavities into the active region. Joannopoulos teaches an SOA

with a 2D PC filter above and below the active region [Fig. 5]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to use a PC filter in the device of claim 1, for the advantage of filtering out unwanted modes without adding heat to the system.

- Regarding claims 10 and 11, Joannopoulos teaches the optical amplifier according to claim 9, wherein said structuring is produced in said active waveguide on respective sides of its longitudinal axis and in a part at least of an upper layer which is placed above said active waveguide and in a passive waveguide, placed below said active waveguide. [Fig. 5, #510, # 508, #506 and #504]
- Regarding claims 12 and 13, Joannopoulos teaches the optical amplifier according to claim 10, wherein said structure defines substantially a photonic crystal of holes or columns constituting diffracting elements and defining a mesh of the order of the wavelength of the photons in the guided mode flowing in said active waveguide whereby said holes or columns extend substantially parallel to said vertical direction of the active waveguide. [Fig. 5, #510]
- Regarding claims 14, Joannopoulos teaches the optical amplifier according to claim 12, wherein said photonic crystal is a paving arrangement of substantially contiguous convex polygons and share each of their edges with a single adjacent one. [Col. 7, lines 33-40]

### ***Conclusion***

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9. While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

10. The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

11. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

12. As to limitations which are considered to be inherent in a reference, note the case law of In re Ludtke, 169 U.S.P.Q. 563; In re Swinehart, 169 U.S.P.Q. 226; In re Fitzgerald, 205 U.S.P.Q. 594; In re Best et al, 195 U.S.P.Q. 430; and In re Brown, 173 U.S.P.Q. 685, 688.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMD 7/28/2006

  
JACK KEITH  
SUPERVISORY PATENT EXAMINER